



## FEBRUARY MEETING - Cellular Communications, Part 1

This month, club member Colin Lodge, G4IHK will describe some aspects of his work in the business of Cellular Communications. According to media reports the Mobile Phone revolution has only just begun. So far, there are 1.8 million subscribers to mobile phone networks, but the figure is expected to grow to 10 million by the turn of the century. The technology to handle this volume of traffic is almost beyond comprehension, so we can look forward to the presentation by Colin of how the system works.

The meeting will open at 7.30pm, in the Marconi College, Arbour Lane, Chelmsford, see you there.

### DATES FOR YOUR DIARY

- 1 Feb. CLUB MEETING - Cellular Comms - Colin, G4IHK.
- 6 Feb. SOUTH ESSEX ARS RALLY - Canvey Island.
- 13 Feb. CAMBRIDGE & DARC RADIO/COMP. RALLY.
- 20 Feb. RSGB VHF CONVENTION - Sandown Park.
- 26 Feb. RAINHAM RADIO RALLY - New Venue!
- 1 Mar. CLUB MEETING - Anglian Water Communications.
- 12/13 Mar. RSGB LONDON RALLY - Picketts Lock.



### CHEERS!

The invitation to use the Bar facilities in Telford Lodge on the evenings of our club meeting still stands but do not be dismayed if you find the front door locked as this action is only a security precaution. Just ring the door bell and the customary warm welcome will result.

### BATTERIES - More Information

1. We were unable to restore the failed Lead-Acid batteries, returned by members at the December Meeting. It appears that in storage the acid-jell has shrunk from normal contact with the plates and the recommended "tricks" have not worked. Injecting distilled water has not been tried because it is difficult to achieve and in any case it is known to considerably reduce the power capacity.

Will the buyers please collect their promised refund from our treasurer, along with the battery if you wish to experiment further!

2. As mentioned at the January meeting, if you have any requirements for small Silver-Zinc batteries for use in watches, cameras, etc. Peter Graves, GØKSJ will have a display case with items for sale at the next meeting, but remember to write down the type number because there are so many variations!

3. A limited stock of fresh Zinc-carbon batteries will be on sale at future meetings. For £1 per pack you can choose from the selection, 2 x R20R(U2), 2 x R14R(U11), 4 x R6R(U16) and 1 x 6F22R(PP3).

This sale produces a small profit to club funds.

### CLUB RIG UPGRADE

The equipment funds are sufficient to make our club Transceiver, YAESU FT-747GX complete by the installation of an FM Module.

We were advised that these modules are becoming short in supply, so the Committee decided to purchase one while the price is still reasonable, with the additional advantage to maintain the commercial value of the rig.

### MEMBERS NEWS - Ela, G6HKM

We are pleased to welcome a new member this month, Charles Minchin, who is a S.W.L.

### COMMITTEE MEETING

The February Committee meeting will be held at 7.30pm on Wednesday 9th February, you are welcome to join us.

### JANUARY FILM SHOW - Harry, G2HPF

The first video was of the AH1A Howland Isle expedition which took place early in 1993. We think we have a hard time getting ready for N.F.D. each year, but just think of the effort required to set up a station running four operating positions at 1KW each for 8 days. Location not just outside Chelmsford but an uninhabited island in the middle of the Pacific ocean.

Heavy equipment had been sent by boat and the operators K9AJ, WØRLX, WØCP, K4UEE, W9IXX, F6EXV, ON6TT, PA3DUU and G4LJF met up in Honolulu. From there they flew to Christmas Island where they transferred by an outrigger fishing boat to the waiting boat MACHIAS, which was a 67ft steel hulled schooner and which had the heavy gear already aboard.

The next part of the trip was a 1350 mile sea trip to Howland Island itself. This is a wild life sanctuary and permission to land there was only given after the team had agreed to take two Fish and Wildlife scientists who would monitor the operation to check that the environment was not harmed. After seven days the island came into sight, it is only 1.5 miles long and 0.5 miles wide so the navigation must have been spot on. There are no trees or hills and tallest vegetation about six inches high. On getting closer two things were visible, the remains of the Amelia Earheart lighthouse and a large KEEP OUT notice.

Landing is tricky as the island is surrounded by a coral reef and the tide has to be just right for the inflatable boats to ride a wave over it and at only one spot. Eventually all the gear was landed and the job of setting up the stations started. The site had to be chosen to avoid the Booby birds which have to sit on their eggs in order to keep them cool. The noon temperature was about 37°C and they expected no rain, but things never go according to plan and everything got wet. Food and water came from MACHIAS each day, but at the end the surf got so heavy the boats could not get through and food and water were put in plastic buckets and thrown in the water to be washed in by the waves.

At the planned finishing time it was impossible to get off the island and had to wait days until the surf allowed them to. At this time the schooner had lost its generator and electrical equipment could not be used, it was running low on fuel but could not stop the engine because no battery to start it again. Both inflatable boats had turned over in the surf and the outboard engines would not start again.

So there they were, cut off on the island with 2 gallons of water and a few tins of spam. At this time of course the rain had stopped and they were scouring the shore for shells containing rainwater.

At this crucial moment we must leave them ....if you want the whole story you must get the complete video from the club library. Was it worth it?, well ask any of the 52,000 hams who worked them.

Following this we had two Tom and Jerry cartoons and after the break there was a video of the 75th anniversary of the RAF show at Fairford. Many old planes were on show, including Chipmunks, Bulldogs, Tucano, Hawks, Tornado and F16's. It finished with the spectacular mid-air collision of the two Russian fighters and the safe ejection of the pilots. One was seen walking across the field lighting a cigarette, whether this was to calm his nerves after the accident or the thought of having to pay for the loss of two planes we will never know.

Thanks to everyone involved in procuring the videos and setting up.

## INRUSH EXPLAINED - Ken, G3PMW

Reading Charles' excellent article on the RSGB HF Convention, one phrase caught my eye "inrush current protection". It is a subject, which I suspect, means very little to most. When rigs are bought from an emporium then inrush current protection, if thought about, is taken care of, . . . . wrong! Inrush current needs to be thought of in at least two ways. The case mentioned by Charles concerned the protection, or life preservation, of an expensive valve.

Inrush current means precisely what it says, we are all familiar with the normal running current; it is related to the power in watts that the equipment takes (Ohm's Law etc), but we are not so familiar with the surge of current that can flow at the time of switching on. This surge current does not last long, a fraction of a second or a few cycles of the mains, but it can be destructive and in some cases lead to hazard.

We do not have to experiment with an expensive valve to get the feel of inrush current, a much closer to home example is our simple incandescent light bulb when looked at from the point of view of inrush. Take a 60 watt light bulb, we know its resistance by using the simple formula with 240v and 60w, it works out to be 960 ohms. We also calculate the current taken from the mains as 0.25 amps. No problem at all, now take a new 60w bulb and measure the cold resistance of the filament. I have, and the resistance was 68 ohms. When the current for this resistance is calculated, it is 3.53 amps! This is inrush current and is over 14 times the normal running current. It does not last long, but it does stress the filament and this is why light bulbs last only 1000 hours if you are lucky. Think, also, what happens if the mains is a little high in voltage, the stress is much greater. The only cure is to provide some extra resistance. A resistor of 68 ohms would halve the inrush current and be fairly insignificant when the filament is hot at 960 ohms. A better solution is to use a negative temperature resistor of high value when cold and low value when hot, the opposite of the lamp filament. Under these conditions the bulb would last a very long time. It is not insignificant that we occasionally hear of a light bulb which is ninety, or so, years old; they are carbon filament lamps!

These thoughts lead to the other side of protection, or hazard. What size of fuse should you use for a 60w light bulb? It cannot be rated at 0.25 amps for the running current, the lamp would never stay on. To use a 3.5 amp fuse for the inrush seems to be excessive, it would sustain a power of 960 watts. This is the dilemma, the 60w lamp is elementary, but when equipment is rated at several kilowatts, an inrush current of 20 times normal looks frightening. Fortunately fuses to BS ratings will look after us, and it explains why equipment manufacturers specify rather high fuse ratings. For home built rigs, the mains fuse should be carefully considered.

My example of the 60w bulb, is a purely resistive case and therefore relatively simple; when inrush currents are considered for iron cored components, i.e. mains transformers, the calculation becomes much more complex, but that is for another instalment.

## I LIKE WATCHING PAINT DRY - Angus, G3FJO

A month or two ago I caught a bad case of "Paketeers" disease and unfortunately I can't shake off the symptoms. It didn't take long to realise that there were a lot of very dedicated people about afflicted with the same ailment, I'm referring to the sysops of the various nodes that keep the whole Packet radio system going world wide. To keep track of everyone I started to draw up a list of all the nodes I saw on my screen together with name, call signs, location and the ports available - so far just over a 120 entries.

Please ask Roy, or myself for a copy alternatively send a message to me G3FJO @ GB7DUG or Stan (Chairman of the Kent and Essex Packet group) G4EGH @ G4EGH.GB7EZB. Failing that an SAE (110mm x 220mm) to my address (in the call book) will get a copy. If you intend to down load from a BBS be warned the file size is currently 7.6 KB so avoid busy times, I shall be splitting it into parts soon and am also preparing a map.

Like everything else, there is a snag. My motives are not entirely altruistic! Would you please help me extend the list and keep it up to date by forwarding new data and corrections (not the whole list please - just the bits that matter).

## TECHNICAL TIP - Geoff, G7KLV

I once had a colleague, Eddie G3IIS, who could always solve an electronic problem, often by using diodes. The number of diodes required would depend on the complexity of the problem. A difficult one would require a generous sprinkling!

I recently installed a spotlight for reading but found that it was too intense for comfort.

The lamp was of the Edison screw type, rated at 60 watts and I didn't have one of that type of lower wattage to hand. . . . Yes, you've probably guessed, I used a diode.

I first came across this simple method of producing an AC voltage drop, without generating heat, in second generation B&W TV sets where a diode is used as part of the series heater voltage dropper network. It was arranged so that if the diode failed it would upset the frame hold thus indicating a fault.

The diode blocks the positive half cycles (or negative, according to which way round it's connected) so reducing the effective power to half. Because  $W=V^2/R$ , the effective voltage across the load is reduced to 0.707 of its original value.

With the 60 watt lamp I used a BY127 diode from an old TV. This type has a current rating of 1 amp and a PIV rating of 1250 volts. The 1N4007 and 1N5408 have ratings of 1000 volts and 1 and 3 amps respectively and would also have been suitable.

I installed the diode in the lamp housing and it gives acceptable brilliance of about 30 watts. If the diode fails either the lamp goes out or it brightens up!

Draw the circuit out and it looks just like a half wave rectifier feeding a resistive load. There's very little new in this life!

To obtain RMS readings of current and voltage requires the use of hot wire or moving iron instruments. An average value reading instrument such as an AVO will not give correct readings.

However, an AVO can be used for voltage and current measurements using a correction factor by multiplying indicated readings by approximately 1.575.

This simple method of reducing AC voltages without generating heat has a number of applications, some examples are as follows:-

- a) reducing lamp brightness.
- b) increasing lamp life by reducing the applied voltage.
- c) keeping a soldering iron on simmer rather than on the boil.

Do not attempt to connect a diode in series with the primary of a mains transformer. The result can be a burnt out transformer. I learnt the hard way!

## FINALE


Many thanks to our contributors for the interesting paragraphs in this months Newsletter, please keep the word processors rolling as your Hon: Editor is **desperate for new material**.

As space permits we will include a resumé of the proceedings in committee, which is now a feature in the Tuesday evening Club Net on 28.325MHz, at 8.30pm local time, so for the latest news, just tune in and even better, if you have any news, please join in.

One topic in committee is our approach to HF Field Day 1994; we have been offered a new site at Tiptree, which is currently under survey from the access and RF point of view. With an improvement in weather we will run a Sunday afternoon check-in on 2 metres to compare HF reception at Tiptree with home-based stations in the surrounding area (similar to the test we made for Howletts Hall farm).

Regarding skeds, the weekly contacts with our twin city, Backnang, are being maintained to Peter, DK7SP on Sundays at 9.30pm around 3.76MHz and Alouis, DL3PD on Tuesdays at noon on 14.305MHz or 12.05pm around 7.07MHz depending on conditions. Alouis has not been very well recently and we wish him a speedy recovery.

73 from Roy & Ela Martyr,  
G3PMX & G6HKM

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